SHARED VISION, SHARED RESPONSIBILITY: THE VERTICAL INTEGRATION OF INFORMATION LITERACY ACROSS THE ZOOLOGY CURRICULUM

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SHARED VISION, SHARED RESPONSIBILITY

ABSTRACT

This paper tells the story of how a shared vision and shared responsibility between the Library and the School of Zoology at the University of Tasmania has led to the vertical integration of information literacy into the Zoology curriculum

Lecturers have embedded meaningful and stimulating learning activities into coursework, deliberately aimed at developing students' information literacy. Students require sound information skills to undertake these activities; these skills are taught by the Liaison Librarian during specially tailored workshops incorporated into the unit teaching.

Activities include: a first-year introduction to information skills and the scholarly information infrastructure; second/third year projects that require students to find 'the science' behind popular wildlife documentaries and to explore issues and controversies of scholarly communication; the introduction of EndNote to third-year students to manage information for their major research project; and advanced skills for Honours students to undertake major literature searches and manage information using EndNote

This paper discusses: the value of contributions from the different perspectives of librarians and lecturers; the importance of an iterative, incremental approach to developing students' information literacy for lifelong learning; what students think; and work that still needs to be done.

INTRODUCTION

At the University of Tasmania, as in other Australian universities, we are working to embed information literacy in the curriculum. Embedding is achieved where curriculum is designed so that "students have ongoing interaction and reflection with information" (Bundy, ed. 2004). The move to embed is in response to our own observations that the teaching and learning approach to these skills needs to be improved. Embedding information literacy is also aligned with universities increasingly taking a student-centred approach to teaching and learning, particularly to develop "deep approaches to learning" (Biggs, 2003). This deep approach requires librarians and academics to review the way we expect students to develop their information literacy (Lupton, 2002).

A glance at the information literacy standards from the *Australian and New Zealand Information Literacy Framework* (Bundy, ed. 2004) should suggest that the teaching of these skills does not simply fall within the domain of either the librarian or the lecturer. "Responsibility [for information literacy] does not start and end with the library" (Lupton, 2002). Information literacy needs to be taught and learnt as part of the curriculum, with input from both lecturers and librarians.

Lupton outlines four components that are required for embedding information literacy into the curriculum:

- Information literacy learning goals and outcomes appear explicitly in subject and course learning outcomes

- Information literacy learning outcomes appear as assessment criteria for assignments
- There is a developmental sequence of learning that occurs throughout a program of study, and
- The teaching librarian is able to ascertain learning outcomes and effectiveness of teaching by viewing students' work (Lupton, 2002)

Where we have succeeded in embedding information literacy in the curriculum at the University of Tasmania, there are strong partnerships between librarians and academics. This paper is about one such partnership between librarians and academics in the School of Zoology initiated and driven by a shared vision and a shared sense of responsibility.

THE RAW MATERIAL

Five years ago students in the Faculty of Science, Engineering and Technology received few information skills programs. The curriculum of the schools was not always conducive to the inclusion of information skills. Not all academics agreed that information skills were essential for undergraduate students. Also, at that time, the University did not have a teaching development unit, and any teaching innovation was driven by the grassroots activity.

Why would you want to do *that*?

From the library perspective, interaction with students in reference enquiries and information skills workshops showed a significant lack of knowledge of information resources and information skills. Students in second and third year units were asking questions in the library that indicated that they had no idea where to start looking for required information for their research assignments.

In workshops for honours students, newly offered at the time, only a minority of students knew their subjects' major databases, were aware of web access to resources or grasped the importance of saving and managing the information that they found. One early incredulous comment from an honours participant is indicative of the level of understanding that many students had of information seeking and managing: in response to being shown how to save records from a search result the student asked: "Why would you want to do *that*?"

First steps in a new direction

The School Zoology already had an established and stable information skills program as part of a first-year unit, *Zoology 1E*, with over 100 enrolments. This program continues today in a modified format, and is significant as it captures students who continue their studies in Plant Science, Agriculture and Environmental Science schools as well as Zoology. The program introduces students to the scholarly information infrastructure and focuses students on finding information for a research essay from a variety of print and electronic sources, supported by a self-paced guide and voluntary workshops. The strength of the program was an assessable "Library Activity" linked to the essay, that required students to record their progress in thinking about and finding information from a variety of sources.

In 1999 the Library made use of the results of the Library Activity. The results provided an insight into the effectiveness of the program. In the component requiring students to demonstrate their ability to find journal articles by formulating effective database search strategies, only one third of the group demonstrated a sound ability and over half showed little or no ability at all (Dearden, 2001). This should be no surprise, as research shows that students perceive finding relevant references using databases as one of the most difficult aspects of assignment-writing (Krause, 2001).

The results of the first year assessment illustrated a strong case for further integration of information skills into students' teaching and learning. However no program existed in subsequent years that would explicitly and deliberately engage students in finding and using information. A vast, barren plain stretched before them.

SHARED VISION

Conversations between librarians and academics confirmed a common concern and recognition of the need to develop students' knowledge and skills.

The findings gained from the first year Zoology program was shared by the library with individual academics and presented to various academic forums with a proposal to develop an approach that vertically integrates information skills into the students' learning. This was an opportunity to present the Library's vision to potential collaborators in the schools. This outreach initiative was a signal that the Library wanted to work with academics to develop information skills programs. The School of Zoology in particular are innovators of teaching and were eager to develop strategies to overtly and deliberately teach information skills to students. The Library's vision matched the School of Zoology's concern to develop students' generic skills, and not only to "[acquire] the knowledge content of the curriculum" (Jones & Barmuta, 2003).

SHARING RESPONSIBILITY: VERTICAL INTEGRATION

Lupton argues that "much of what is presented as information literacy is actually library skills, user education or bibliographic instruction" (2002). A library-centred approach has limitations in how far students can be engaged and stimulated - in short, to have an exciting learning experience.

The results of the first-year Zoology activity show the limitations of a one-off first-year library-focused information skills programs in developing students' ability to have an ongoing interaction with information. The collaboration between the Science Library and School of Zoology shows how the embedding of information literacy into the teaching and learning makes for more effective, deeper learning, through enriching the students' experience.

Two major developments occurred in the teaching and learning of Zoology students that have expanded the integration of information literacy vertically, with students developing their skills and knowledge incrementally. Two units, one second-year (*Tasmanian Fauna*) and the other a new second/third-year unit (*Evolution, Ecology and Society*),

expand on the first-year experience and embed information literacy teaching into the Zoology curriculum exciting ways.

Tasmanian Fauna

Tasmanian Fauna is a first semester, second year unit. The unit's learning activities includes an exercise entitled "Information Literacy". The learning aim and outcomes are clearly stated (Fig 1). Students are required to find the "science" behind a popular wildlife documentary, thereby exploring information in the context of different ways of communicating science. This is an assessable assignment; the learning objectives, drawn from the Information Literacy Standards (Council of Australian University Librarians, 2001) are outlined in the practical manual. Students have a choice of viewing one of two wildlife videos. The learning activity requires the students to find the scientific publications that support and develop the concepts conveyed in a popular documentary.

Exercise 6: Information Literacy
Aims:
You will improve your information literacy skills by learning how to follow up information in two documentary videos. The videos illustrate two topics from the lecture course

Outcomes:
Improved information literacy skills, particularly:

a) recognizing the need for information
b) accessing information effectively and efficiently
c) evaluating information
d) reinforcing course concepts

The Library work is outlined as follows:

- Complete the list of scientific names of the animals dealt with in the video
- Use the topic you noted during the video as the basis for a library search
- Write a brief outline of how you found information on these topics (use a range of resources – reference material, books and journal articles)
- Read the information you found. How well do you think the video covered the science of the subject?
- Why do you think there were discrepancies between the scientific material and what was shown in the video?

Figure 1 Information Literacy Assessment Item for Tasmanian Fauna

It is in this context that an information skills workshop is delivered by the library, with the documentaries forming the information-seeking motivation for the workshop. Instruction is kept to a minimum to allow students to search for the information in which they are interested, and supplemented with self-paced guides and model search strategies.

The shared responsibility between the library and the school is extended to assessment, where the librarian marks the student's outline of how they found information for their topics.

Evolution, Ecology and Society (EES)

"The emphasis [in EES] is on improving skills in researching and collating published scientific evidence, understanding and evaluating competing arguments and integrating and presenting scientific arguments" (Jones & Barmuta, 2003). In this way, the subject

incorporates the entire information literacy continuum and presents stimulating and exciting ways for students to develop these skills. The unit is taught in four learning modules dealing with topical issues in science

In the library component, the students' conceptual framework of the scientific information infrastructure is reinforced and extended as students confront issues and controversy in scholarly communication. To participate in the unit, students must understand, distinguish and use databases that index Australian grey literature, the main subject-specific databases and the citation database, Web of Science. The workshops are co-taught by the librarian and academic. As in the other subjects, the workshops have immediate relevance and continue the iterative approach in exposing students to similar knowledge and skills, but at a deeper, more complex level. The unit itself takes a "spiral " approach to learning (Jones and Barmuta, 2003), requiring the students to continually use a range of information resources.

Assessment of the unit includes two reports. Assessment criteria for these reports is clearly outlined and explicitly includes criteria for assessing information literacy skills (Figure 2).

• demonstrates appropriate breadth and depth of reading research
• demonstrates an ability to synthesise and integrate material from a range of sources into a coherent review
• demonstrates ability to critically evaluate sources of information
• highlights key issues raised by current knowledge
• a full reference list is provided as an appendix

Figure 2. Extract of assessment criteria for EES Module Reports

"Student performance against assessment criteria show them to have developed skills in information literacy, an ability to synthesise, critique and evaluate scientific literature, and to appreciate where new research is needed", and lecturers are impressed with the high quality of the module reports (Jones & Barmuta, 2003) .

EndNote for 3rd year research projects

In response to student requests, EndNote was taught for the first time in 2003 to Zoology students for a major third-year research assignment for *Evolutionary Biology and Biogeography (EBB)*. This was feasible and desirable because most of the students will have completed at least two of the previous subjects. We were confident that most students had a well-developed knowledge and skills in the use of databases which served as an appropriate skills base for introducing EndNote. More importantly, the student-driven workshop indicated an attitude and preparedness for EndNote that could only have been acquired incrementally and iteratively from experience in their earlier years. Rather than asking incredulously, "Why would you want to do that?" students were now the drivers, appreciating the value and importance of information and the tools to find and management information. In this way, students in third year are demonstrating skills, knowledge and attitudes that would prepare them for a major research project in their honours year, or as competent information users in the workforce.

Advanced skills for honours students

Advanced information skills workshops are offered to honours students in the Zoology induction program. By this time, students have negotiated their research projects and air ready to embark on their literature reviews.

Because of the increasing vertical integration of information skills, and the increasing depth of students' prior knowledge, the format and content changes from one workshop program to the next. EndNote has become the focus of the workshop since 2003 (with the University's acquisition of an EndNote site licence). Students learn how to transfer records from a variety of databases to their EndNote library. The workshop is an opportunity to begin their literature search and to start an EndNote library of relevant sources for their literature review. Students, then, are expanding their information retrieval skills, but also developing skills in managing information for their research.

Vertical integration of Information Literacy

The vertical integration of information literacy in the Zoology undergraduate curriculum is achieved through the library and the school sharing responsibility to embed learning experiences into the curriculum: the initial introduction of first-year students to the scholarly information infrastructure and methods for finding information from a variety of print and electronic sources; exploring information in the context of communicating science in second year (Tasmanian Fauna); confronting issues and controversy in context of scholarly communication in EES; learning how to use information management software for a major third-year research assignment (EBB); and developing advanced skills to find and manage information for the honours research project (Figure 3).

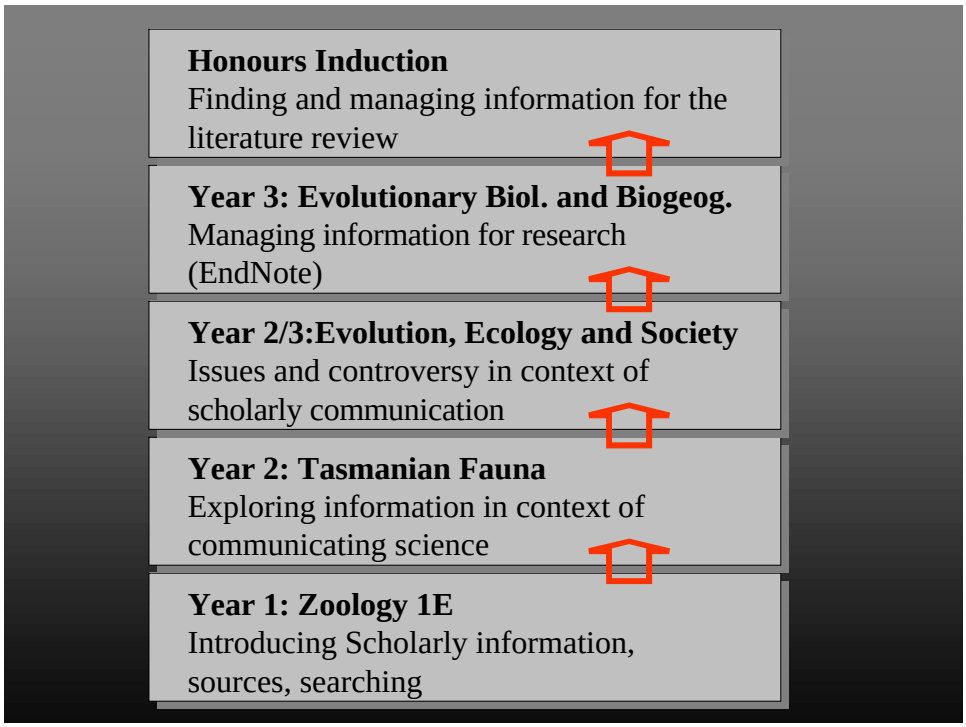

Figure 3. Vertical integration of information literacy in the Zoology curriculum

STUDENTS AS DRIVERS – WHAT THE STUDENTS THINK

In 2003 first-year students were asked to comment on their experience of finding information for their assignment. The three main responses were that they: found the exercise useful; found the process difficult; and knew the information already. Almost two thirds (61%) commented that they found the exercise helpful; 23% commented that they found the process difficult; and 7% commented that they already had the knowledge and skills. Significantly the comments were positive, with only three exceptions that made remarks expressing unhappiness about the activity.

Jones and Barmuta (2002) report that student feedback from SETL evaluations of *EES* is high, with positive comments acknowledging the value of the unit's goals in developing generic skills. Students also appeared to value the transferability of the skills with 95% agreeing that they saw the importance of this unit ... for other areas of study (SETL unit evaluation 2002).

An interview with one outstanding student is useful to report. Her experience of *EES* was a watershed where she believes she properly learnt how to find and evaluate and use information. Previously she found the library and databases "scary" and finding information "traumatic". Since *EES* she can search databases effectively, and easily determine what to use and what to discard. She now applies the skills to other subjects, knowing when she is "onto something" and using articles to develop and back-up her arguments.

These indicators of attitudinal development appear to be borne up in responses to the 3rd year EndNote workshop evaluation where 10 of 15 participants submitted workshop evaluation forms. All responded positively, with 9 of the 10 saying that they will apply 75-100% of the content. Several students commented that EndNote should be introduced earlier in their studies, either in 2nd year or first semester in 3rd year.

Responses from honours students' workshop evaluation have always be very positive, with students indicating the usefulness and applicability of skills learnt or consolidated. In 2003 students indicated the value of EndNote to them in their comments, for example: "[the workshop was] very useful, especially endnote, WoS [Web of Science] and database search specifics". Significantly however, the honours coordinator reported that in 2003, only half the students fully utilized the features of EndNote, indicating that more work needs to be done in this regard.

While a more methodical approach to evaluating the success of the vertical integration is required, student feedback indicates that students require and appreciate explicit, incremental and iterative teaching of information literacy skills.

WHAT NEXT

These Zoology units that vertically integrate information literacy by including explicit teaching and learning of these skills do not, however, represent a complete picture of the Zoology curriculum. Not all students of Zoology receive the same teaching, as it depends

on whether or not they elect to undertake the units discussed. Mapping of information skills across all Zoology subjects needs to be undertaken. A more methodical approach should be taken to evaluate the effectiveness of the vertical integration. It also throws other Faculty courses into perspective and shows the need to extend this approach to other courses and units.

This year the Faculty has received a teaching development grant to assess information literacy skills of students at a program level and map information literacy in the curriculum of three of the Faculty's schools. This project will enable us to improve the work we have done so far, and provide a foundation to expand the vertical integration of information literacy in other Faculty courses.

CONCLUSION

One measure of success of the integration of information literacy into the Zoology curriculum is to compare our practice with Lupton's four components required for embedding information literacy into the curriculum (2002) outlined in the introduction: information literacy learning goals and outcomes are explicit in *Zoology 1E*, *Tasmanian Fauna* and *EES*; assessment is undertaken in these units to measure student learning and the effectiveness of our teaching and learning approaches; student skills and knowledge are developed through an iterative, incremental approach – a "developmental sequence of learning" - from first year through to honours year; and the librarian is actively engaged in assessment, with significant responsibility in the first-year and second-year units.

This experience has honed our vision to the extent that we can now see more clearly into the future. We have been successful in broadening the interest in information literacy by teaming up with other academics in the Faculty who also share the vision.

The development of the vertical integration of information literacy with its iterative, incremental approach to developing students' skills has in itself been an incremental process, buoyed and sustained by a shared vision and responsibility.

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